WHAT IS CLAIMED IS:

1. An optical interrogation system comprising:
a light source for outputting a light beam;
a diffractive optic for receiving the light beam and outputting an array of light beams; and
a collimating optic for receiving and conditioning the array of light beams and outputting the conditioned array of light beams which have desired optical properties towards a specimen array.

2. The optical interrogation system of Claim 1, further comprising a detector for receiving an array of light beams reflected from the specimen array.

3. The optical interrogation system of Claim 1, wherein said collimating optic is a simple lens, array of simple lenses, f-θ lens, parabolic mirror, segmented mirror, or a refracting lens made from a set of precisely placed and angled refracting wedges.

4. The optical interrogation system of Claim 1, wherein said collimating optic is a segmented mirror and each segment of said segmented mirror reflects one of the light beams emitted from said diffractive optic so that the reflected light beam is equidistant from neighboring reflected light beams when impinging a plane of the specimen array.

5. The optical interrogation system of Claim 1, wherein said collimating optic is a fiber array that re-conditions the optical character of each light beam emitted from said diffractive optic.

6. The optical interrogation system of Claim 5, wherein said fiber array includes a plurality of fibers each of which has one end arranged on a circumference of a sphere and another end connected to a grid.

7. The optical interrogation system of Claim 1, wherein said collimating optic is a lenslet array that re-conditions the optical character of each light beam emitted from said diffractive optic.

8. The optical interrogation system of Claim 1, wherein said collimating optic is a combined fiber array and lenslet array that re-conditions the optical character of each light beam emitted from said diffractive optic.

9. The optical interrogation system of Claim 1, further comprising a beam reconditioning optic located between said light source and said diffractive optic and used for controlling the numerical aperture, spot size, and angle of incidence of each light beam emitted from said collimating optic that impinges a plane of the specimen array.

10. The optical interrogation system of Claim 1, further comprising a wavelength tunable filter located between said light source and said diffractive optic and used to adjust each light beam emitted from said collimating optic to enable wavelength interrogation of the specimen array.

11. The optical interrogation system of Claim 1, further comprising a mask located between said collimating optic and said specimen array and used to block predetermined conditioned light beams from reaching selected specimens in the specimen array.

12. The optical interrogation system of Claim 11, wherein said mask is an electronically controlled liquid crystal mask.

13. The optical interrogation system of Claim 1, further comprising a mask located between a detector and said specimen array and used to block predetermined light beams reflected from selected specimens in the specimen array.

14. The optical interrogation system of Claim 13, wherein said mask is an electronically controlled liquid crystal mask.

15. The optical interrogation system of Claim 1, further comprising a swept angle detection system for receiving an array of light beams reflected from the specimen array.

16. The optical interrogation system of Claim 16, wherein said swept angle detection system includes:

a rotating mirror for reflecting an array of light beams reflected from the specimen array;

an aperture plate having one or more holes through which passes selected ones of the light beams reflected from the rotating mirror;

an array of photodetectors for receiving the light beams that passed through the aperture plate; and

a data acquisition system for analyzing data received from said array of photodetectors.

17. The optical interrogation system of Claim 1, further comprising a swept angle launch system including a rotatable beam deflector located between said light source and said diffractive optic to control the angle of incidence of the light beam directed into said diffractive optic.

18. The optical interrogation system of Claim 1 is used to interrogate grating or non-grating based sensors in a specimen array.

19. The optical interrogation system of Claim 1 is used in one of the following applications including Infrared and Ultra-violet Absorption Spectroscopy, Fourier Transform Infrared Absorption (FTIR) Spectroscopy, Raman Spectroscopy, Reflection Spectroscopy, Fluorescence Spectroscopy, Flourescence Lifetime Spectroscopy or Surface Plasmon Resonance Spectroscopy.

20. The optical interrogation system of Claim 1 has optical frequencies that span across the entire usable electromagnetic frequency spectrum.

21. A method for interrogating one or more specimens in a specimen array, said method comprising the steps of:

using a light source to generate a light beam;

using a diffractive optic to receive the light beam and output an array of light beams; and

using a collimating optic to receive and condition the array of light beams and then output the conditioned array of light beams which have desired optical properties towards a specimen array.

22. The method of Claim 21, further comprising the step of using a detector to receive an array of light beams reflected from the specimen array.

23. The method of Claim 21, wherein said collimating optic is a simple lens, array of simple lenses, f-θ lens, parabolic mirror, segmented mirror or a refracting lens made from a set of precisely placed and angled refracting wedges.

24. The method of Claim 21, wherein said collimating optic is a segmented mirror and each segment of said segmented mirror reflects one of the light beams emitted from said diffractive optic so that the reflected light beam is equidistant from neighboring reflected light beams when impinging a plane of the specimen array.

25. The method of Claim 21, wherein said collimating optic is collimating optica fiber array that re-conditions the optical character of each light beam emitted from said diffractive optic.

26. The method of Claim 25, wherein said fiber array includes a plurality of fibers each of which has one end arranged on a circumference of a sphere and another end connected to a grid.

27. The method of Claim 21, wherein said collimating optic is a lenslet array that re-conditions the optical character of each light beam emitted from said diffractive optic.

28. The method of Claim 21, wherein said collimating optic is a combined fiber array and lenslet array that re-conditions the optical character of each light beam emitted from said diffractive optic.

29. The method of Claim 21, further comprising the step of using a beam reconditioning optic located between said light source and said diffractive optic to control the numerical aperture, spot size, and angle of incidence of each light beam emitted from said collimating optic that impinges a plane of the specimen array.

30. The method of Claim 21, further comprising the step of using a wavelength tunable filter located between said light source and said diffractive optic to adjust each light beam emitted from said collimating optic to enable wavelength interrogation of the specimen array.

31. The method of Claim 21, further comprising the step of using a mask located between said collimating optic and said specimen array to block predetermined conditioned light beams from reaching selected specimens in the specimen array.

32. The method of Claim 31, wherein said mask is an electronically controlled liquid crystal mask.

33. The method of Claim 21, further comprising the step of using a mask located between a detector and said specimen array to block predetermined light beams reflected from selected specimens in the specimen array.

34. The method of Claim 33, wherein said mask is an electronically controlled liquid crystal mask.

35. The method of Claim 21, further comprising the step of using a swept angle detection system to receive an array of light beams reflected from the specimen array.

36. The method of Claim 35, wherein said swept angle detection system includes:

a rotating mirror for reflecting an array of light beams reflected from the specimen array;

an aperture plate having one or more holes through which passes selected ones of the light beams reflected from the rotating mirror;

an array of photodetectors for receiving the light beams that passed through the aperture plate; and

a data acquisition system for analyzing data received from said array of photodetectors.

37. The method of Claim 21, further comprising the step of using a swept angle launch system including a rotatable or acousto-optical beam deflector located between said light source and said diffractive optic to control the angle of incidence of the light beam directed into said diffractive optic.